

REMARKS/ARGUMENTS

The present Amendment is in response to the Office Action mailed September 12, 2002 in the above-identified patent application. Enclosed herewith is a Petition requesting a three-month extension of time for resetting the deadline for responding to the Office Action from December 12, 2002, to and including March 12, 2003.

The Examiner objected to claim 17, asserting that the claim has no end punctuation. In response, claim 17 has been amended to add a period at the end of the claim.

The Examiner rejected claims 1-6, 8-12, 14 and 16-18 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 6,119,927 to Ramos. A review of the cover page of Ramos indicates that it has a filing date of February 18, 1998 and claims priority of three Provisional Applications: 60/038,097 filed February 18, 1997; 60/071,751 filed January 16, 1998; and 60/073,964 filed February 6, 1998.

As an initial matter, Applicant notes that the '097 provisional application (copy enclosed) is directed to using a vacuum loader plate and an alignment plate for positioning solder balls atop contact pads of a microelectronic element. Applicant respectfully asserts that the '097 provisional application does not provide support for the shutter plate 40 shown in FIGS. 3A-5C of Ramos. As such, the disclosure of the present application, which claims priority of U.S. Provisional Application No. 60/048,178 (copy enclosed), filed May 30, 1997, antedates much of the disclosure set forth in Ramos. Clearly, Applicant's earlier priority date of May 30, 1997 precedes the filing date of the '751 and '964 provisional applications, as well as Application No. 09/027,042 filed February 18, 1998.

In response to the Examiner's rejection under the Ramos '927 patent, and in order to more clearly set forth the

scope of the present invention, Applicant has amended claim 1 to recite that "said conductive elements have a diameter and said main body and said spacer element have a combined thickness that is substantially equivalent to the diameter of said conductive elements." Support for this recitation is shown in FIGS. 18 and 19 of the present application, as well as described in the specification at, *inter alia*, page 17, line 17 - page 18, line 8. As described therein, providing a main body and a spacer element having a combined "thickness that is substantially equivalent to the diameter of said conductive elements" insures that each deposited solder ball 120 will fall almost completely into one of the openings 108 in the solder ball stencil 102 and will not significantly protrude over the top surface 104 of the solder ball stencil 102. This avoids obstructing the movement of other solder balls 120 over the top surface 104 of the solder ball stencil 102. In addition, this particular feature prevents solder balls 120 which have been successfully deposited in one of the stencil openings 108 from becoming dislodged from the opening by other solder balls 120 moving across the top surface 104 of the stencil 102. Page 18, lines 1-8.

Claim 1 is unanticipated by Ramos because the cited reference neither discloses nor suggests that the "main body and said spacer element have a combined thickness that is substantially equivalent to the diameter of said conductive elements." Clearly, Ramos' alignment plate 30 and carrier 20 (FIG. 9A) have a combined thickness that is much greater than the diameter of the solder ball 33. Claim 1 is also unanticipated because Ramos neither discloses nor suggests "a spacer element under the bottom surface of said main body, said spacer element being adapted for maintaining said main body above the first surface of said microelectronic element and remote from said pads." Referring to FIG. 9A thereof, there is

no indication that Ramos' carrier 20 maintains the alignment plate 130 above the top surface of the microelectronic element 23. For all of these reasons, claim 1 is unanticipated by Ramos and is otherwise allowable.

Claim 2 is unanticipated by Ramos because the cited reference neither discloses nor suggests that the "spacer element is attached to the bottom surface of said main body." Once again, FIG. 9A does not show or suggest that the carrier 20 is attached to the bottom surface of alignment plate 130. For all of these reasons, claim 2 is unanticipated by Ramos and is otherwise allowable. Claims 2-6 are also unanticipated, *inter alia*, by virtue of their dependence from claim 1, which is unanticipated for the reasons set forth above.

Claims 8 and 9 are also unanticipated, *inter alia*, by virtue of their dependence from claim 1, which is unanticipated for the reasons set forth above.

Claim 10 is unanticipated because the '097 provisional application does not disclose a "reservoir disposed over the top surface of said main body, said reservoir being adapted to retain said conductive elements remaining over the top surface of said main body after one or more of said conductive elements have been deposited in the plurality of openings extending between the top and bottom surfaces of said main body." A review of the '097 provisional application clearly shows that a reservoir was neither contemplated nor disclosed by the Applicant of the '097 application at the time of filing. An analogous structure, the shutter plate 40 shown in FIGS. 5A-5C of the Ramos '927 patent, was not filed in the Patent Office until after the priority date of the present application (May 30, 1997). For all of these reasons, claim 10 is unanticipated by Ramos and is otherwise allowable. Claim 11 is also unanticipated, *inter alia*, by virtue of its dependence from

claim 10, which is unanticipated for the reasons set forth above. Claims 12 and 13 are unanticipated, *inter alia*, by virtue of their dependence from claim 1, which is unanticipated for the reasons set forth above.

As noted above, claim 14 has been amended. Claim 14 is unanticipated by Ramos because the cited reference neither discloses nor suggests an assembly including a microelectronic element, a spacer plate and a stencil wherein "the top surface of said conductive element stencil and the first surface of said microelectronic element [define] a distance that is approximately equal to the diameter of said conductive elements." As noted previously, Ramos discloses an alignment plate 130 (FIG. 9A) that is significantly thicker than the diameter of the solder balls 33. For all of these reasons, claim 14 is unanticipated by Ramos and is otherwise allowable. Claims 16 and 17 are unanticipated, *inter alia*, by virtue of their dependence from claim 14, which is unanticipated for the reasons set forth above.

Claim 18 is also unanticipated because the cited reference neither discloses nor suggests an assembly including a "microelectronic element having a first surface and one or more terminals on said first surface, wherein a mass of flux material is deposited over each said terminal." Ramos teaches a flux-free process. In addition, Ramos does not teach or suggest an assembly including "a reservoir disposed over the top surface of said stencil, said reservoir being adapted to retain said conductive elements remaining over the top surface of said stencil after one or more of said conductive elements have been deposited in said openings in said stencil."

The Examiner also rejected claims 7 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Ramos. Claim 7 is unobvious because Ramos neither discloses nor suggests an

assembly "wherein the top surface of said main body and the first surface of said microelectronic element define a distance that is approximately equal to the diameter of said conductive elements." Referring to FIG. 9A thereof, Ramos clearly shows that its alignment plate 130 is substantially thicker than the diameter of solder ball 33. Thus, Ramos does not teach or suggest the limitations set forth in claim 7. For these reasons, claim 7 is unobvious over Ramos and is otherwise allowable. Claim 7 is also unobvious, *inter alia*, by virtue of its dependence from claim 1, which is patentable for the reasons set forth above.

Claim 15 has been cancelled, thereby rendering the Examiner's rejection moot. Applicant notes that some of the limitations of claim 15 were added to claim 14 which has been amended as noted above. Applicant respectfully disagrees with the Examiner's assertion that "it would have been an obvious matter of design choice . . . to choose this particular dimension because Applicant has not disclosed that the dimension is for a particular unobvious purpose, produces an unexpected result or is otherwise critical." In fact, Applicant has noted in the specification at page 17, line 24 - page 18, line 8, that it is critical that the distance between the top surface of the conductive element stencil and the first surface of the microelectronic element is approximately equal to the diameter of the conductive elements. The distance is necessary to prevent two conductive elements from falling into the same opening of the stencil and to prevent a positioned conductive element from being displaced from its position within the opening.

The Examiner also rejected claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Ramos, and further in view of U.S. Patent 5,762,258 to Le Coz. Le Coz has been cited as

teaching a microelectronic element which includes a printed circuit board. In response, Applicant respectfully asserts that Le Coz does not overcome the deficiencies noted above in Ramos. As such, claim 13 is unobvious and is otherwise allowable. Claim 13 is also unobvious, *inter alia*, by virtue of its dependence from claim 1, which is unobvious for the reasons set forth above.

The Examiner also rejected claim 18 under 35 U.S.C. § 103(a) as being unpatentable over Ramos and U.S. Patent 5,934,545 to Gordon. The Examiner has cited the Gordon reference as teaching the use of flux for holding solder balls over contact pads. In response, Applicant respectfully asserts that one skilled in the art would have no motivation to combine Gordon with Ramos. Ramos specifically teaches that the use of flux is undesirable and to be avoided. Clearly, Ramos teaches away from the use of flux. Thus, one skilled in the art would have no motivation to combine Gordon and Ramos. For all of these reasons, claim 18 is unobvious over Ramos and Gordon and is otherwise allowable. Claim 18 is also unobvious because the combination of Ramos and Gordon neither discloses nor suggests an assembly including "a reservoir disposed over the top surface of said stencil, said reservoir being adapted to retain said conductive elements remaining over the top surface of said stencil after one or more of said conductive elements have been deposited in said openings of said stencil."

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

As it is believed that all of the rejections set forth in the Official Action have been fully met, favorable reconsideration and allowance are earnestly solicited.

Application No.: 09/650,834

Docket No.: TESSERA 3.0-132 DIV

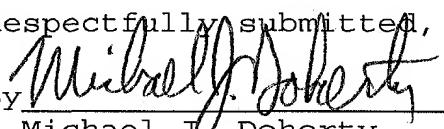
If, however, for any reason the Examiner does not believe that such action can be taken at this time, it is respectfully requested that he telephone Applicant's attorney at (908) 654-5000 in order to overcome any additional objections which he might have.

If there are any additional charges in connection with this requested amendment, the Examiner is authorized to charge Deposit Account No. 12-1095 therefor.

Dated: March 11, 2003

Respectfully submitted,

By



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Version With Markings to Show Changes Made

IN THE ABSTRACT:

A stencil assembly for placing conductive elements over conductive pads accessible at a first surface of a microelectronic element includes a main body having a top surface and a bottom surface and a plurality of openings extending between the top and bottom surfaces, the main body being adapted for overlying the first surface of the microelectronic element so that the openings are in substantial alignment with the pads of the microelectronic element. The stencil assembly also includes a spacer element under the bottom surface of the main body, the spacer element being adapted for maintaining the main body above the first surface of the microelectronic element and remote from the pads of the microelectronic element. The main body and the spacer element have a combined thickness that is substantially equivalent to the diameter of the conductive elements.

IN THE CLAIMS:

1. (Amended) A stencil assembly for placing conductive elements over conductive pads provided at a first surface of a microelectronic element, said stencil assembly comprising:

a main body having a top surface and a bottom surface and a plurality of openings extending between the top and bottom surfaces, said main body being adapted for overlying the first surface of said microelectronic element so that said openings are in substantial alignment with the pads accessible thereat; and

a spacer element under the bottom surface of said main body, said spacer element being adapted for maintaining said

main body above the first surface of said microelectronic element and remote from said pads, wherein said conductive elements have a diameter and said main body and said spacer element have a combined thickness that is substantially equivalent to the diameter of said conductive elements.

7. (Amended) The stencil assembly as claimed in claim 1, wherein the top surface of said stencil main body and the first surface of said microelectronic element define a distance that is approximately equal to the diameter of said conductive elements, so that said conductive elements do not substantially protrude over the top surface of said main body stencil when said conductive elements are over said pads.

10. (Amended) The stencil assembly as claimed in claim 1, further comprising a reservoir disposed over the top surface of said main body, said reservoir being adapted to retain said conductive elements remaining over the top surface of said main body after one or more of said conductive elements have been deposited in the plurality of openings extending between the top and bottom surfaces of said main body.

15.14. (Amended) An assembly comprising:

a microelectronic element having a first surface and one or more terminals accessible at said first surface;

a spacer plate having a top surface, a bottom surface and at least one opening extended therethrough secured over the first surface of said microelectronic element, wherein said at least one opening of said spacer plate is in substantial alignment with said terminals;

a stencil having a top surface and a bottom surface and a plurality of openings extending therethrough secured over

said spacer plate so that the plurality of openings in said stencil are in substantial alignment with said terminals, wherein said spacer plate holds said stencil remote from said terminals, and wherein conductive elements are deposited through the openings in said stencil so that each said deposited conductive element is affixed atop one of said terminals. —

15. The assembly as claimed in claim 14, wherein the top surface of said conductive element stencil and the first surface of said microelectronic element define defining a distance that is approximately equal to the diameter of said conductive elements so that said conductive elements do not substantially protrude over the top surface of said conductive element stencil when said conductive element stencil is positioned atop the first surface of said microelectronic element.

16. (Amended) The assembly as claimed in claim 14, wherein said spacer plate includes a substantially flat plate that is disposed between the first surface of said microelectronic element and the bottom surface of said element stencil.

17. (Amended) The assembly as claimed in claim 14, wherein said stencil has a thickness of approximately 160-200 microns.

18. (Amended) An assembly comprising:

a microelectronic element having a first surface and one or more terminals on said first surface, wherein a mass of flux material is deposited over each said terminal;

a spacer plate having a top surface, a bottom surface and at least one opening extending therethrough over the first surface of said microelectronic element so that said at least one opening is in substantial alignment with said terminals;

a stencil including a substantially flat plate having a top surface and a bottom surface and a plurality of openings extending between the top and bottom surfaces, said stencil being secured over said spacer plate so that the plurality of said openings extending between the top and bottom surfaces being secured over said spacer plate so that the plurality of said openings in said stencil are in substantial alignment with said masses of flux material; and

a conductive element being deposited in each said opening in said stencil, wherein each said deposited conductive element is positioned atop one of said masses of flux material; and

a reservoir disposed over the top surface of said stencil, said reservoir being adapted to retain said conductive elements remaining over the top surface of said stencil after one or more of said conductive elements have been deposited in said openings of said stencil.

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